PROJECT DESCRIPTIONS: COMBINED DELTA COUNTIES COALITION AND CALIFORNIA PARTNERSHIP FOR THE SAN JOAQUIN VALLEY WATER RESOURCE MANAGEMENT PROJECTS LIST

INTRODUCTION AND PURPOSE OF THE PROJECTS

About the intent – the projects proposed herein are not meant to be comprehensive for the San Joaquin Valley and Delta but *representative* and *precedent-setting* to the extent they can produce tangible results and benefits to the State as a whole and reduce barriers for similar projects in the future. Some are likely to be implementable fairly soon, others may take more effort and time, therefore evaluation criteria are incorporated into a support document (spreadsheet attached) to help prioritize the recommendations for implementation.

The projects do not create substantial new water supplies such that they significantly reduce total demands for water, instead they offer management strategies that change the current water demands from activities that may exacerbate critical Delta water conditions to opportunistic strategies that emphasize diversion of wet year supplies or employ conservation. The concept includes managing downstream flooding by supporting storage of those flood waters for use in drier years resulting in less Delta diversions at critical times. The strategy also includes a strong commitment to "demand" management by proposing additional investment in water use technology and re-cycling projects.

ENVIRONMENTAL RESTORATION PROJECTS

EN #1

"Level 2" Refuge Water Supply Diversification Demonstration Project – Merced County

This project is designed to diversify sources of "Level 2" CVPIA (Central Valley Project Improvement Act) water for Central Valley federal and state wildlife refuges with non-Central Valley Project (CVP) sources, as required by CVPIA. CVP yield south-of-Delta currently supplies nearly all Level 2 Water (422,251 acre-feet) to the refuges. Other potential Level 2 Water sources include groundwater, non-CVP surface water supplies, and conserved water, as well as water made available through exchanges. The benefit of finding and delivering non-CVP water results in a 50-50 split of the CVP allocation replaced by the non-project water, with the shares split with the agricultural users and the wetlands (which then actually increases refuge supplies; non-CVP water plus 50% of previous CVP allocation). The project involves a "demonstration" of how uses of alternate supplies meet the needs of all the parties including the refuges and contract water users. The project is in the Westside IRWMP.

Environmental benefit: A more reliable water supply for the refuges

Integration: The split of the CVP allocation allows for improved total water supplies for both parties

Status: individual projects moving forward; *possible expansion* for a more comprehensive program

Cost estimate: variable, but capital and o&m on well water establishes a reasonable benchmark; approximately $75 to $125 af (depends on well, water depth and energy costs). For a first phase, fifty average wells (1500 gpm) would develop 30,000 af (pumping to meet 100 days of wetland operation) = $3 mil.

Potential funding sources: Conservation funds (USDA-WHIP, USBR, DWR), bond funds

Sponsor: San Luis and Delta-Mendota Water Authority

EN #2

Pilot Fish Screen at Clifton Court Forebay – San Joaquin County

The Pilot Fish Screen project includes the installation of a 2,000 cfs positive barrier screened intake near the Clifton Court Forebay. The most likely location for the facilities is on Old River on the southeast corner of Byron Tract. The installation of Clifton Court Forebay fish screens would continue to provide benefits in the long term, with or without an isolated facility and would have prevented shutdown of both CVP and SWP pumps in May 2009 due to excessive take at the Clifton Court salvage facility. August 2009 USFWS study shows delta smelt losses and take is 5 to 200 times worse than previously believed in Clifton Court Forebay, making the pumps more vulnerable than ever to shutdowns due to take. The core of the project is to develop a "design" that is compatible with all the goals, fish protection and water supply pumping reliability.

Environmental Restoration Benefits: Reduce the number of Delta fish entrained at the export pumps in Clifton Court Forebay.

Integration: Reduced Delta fish takings could improve Water Supply reliability for CVP and SWP.

Status: The Metropolitan Water District, Contra Costa Water District, Santa Clara Valley Water District, Alameda County Water District, and Zone 7 Water Agency are currently conducting a "Study to Develop Alternatives for Pilot Fish Screens". If results from the study are positive, implementation should be the next step.

Cost estimate: To be determined.

Potential funding sources: State bond funds Proposition 1E and 84, State and Federal Water Contractors, Regional Sponsors.

Sponsor & Contact Information: MWD, Alameda County Water District, Zone 7 Water Agency, and Contra Costa Water District

EN #3

Suisun Marsh Restoration – Solano County

The Suisun Marsh Restoration Plan includes restoring 5,000 to 7,000 acres in the Marsh to fully functioning, self-sustaining brackish tidal wetland and protecting and enhancing existing tidal wetland acreage. The Plan also includes enhancing the remaining 44,000 to 46,000 acres of managed wetlands by enhancing levee stability and the flood and drainage capabilities within the Marsh. The Plan is intended to maintain the heritage of waterfowl hunting and other recreational opportunities and increase the surrounding communities' awareness of the ecological values of the Marsh; maintain and improve the Marsh's levee system integrity to protect property, infrastructure, and wildlife habitats from catastrophic flooding; and protect and improve water quality for beneficial uses in the Marsh.

Environmental Restoration Benefits: Restoration of tidal wetlands would help to achieve the restoration goals established for the Marsh by the CALFED ERP Plan, San Francisco Bay Area Wetlands Ecosystem Goals Project, and USFWS's Draft Tidal Recovery Plan for the Suisun Marsh Ecoregion. Restoration of tidal wetlands in the Marsh would contribute to the recovery of special-status wildlife species, including small mammals (salt marsh harvest mouse, Suisun shrew), birds (California clapper rail, California black rail, Suisun song sparrow, salt marsh common yellowthroat), fish (salmonids, Delta smelt, longfin smelt, Sacramento splittail, green sturgeon), and plants (soft bird's-beak, Suisun thistle, Delta tule pea). Tidal wetland restoration also will be designed to accommodate sea level rise more easily than managed wetlands because the gradual elevations within tidal wetlands will not require the same level of levee maintenance and will provide an area for sediment accretion.

Integration: Restoration of wildlife habitat, improved water quality, preservation and enhancement of recreational opportunities, and adaptation to climate change.

Status: EIR/EIS completed in December 2011.

Cost estimate: To be determined.

Potential funding sources: Federal Appropriations, State bond funds Proposition 1E and 84.

Sponsor & Contact Information: U.S. Department of the Interior, Bureau of Reclamation; U.S. Fish and Wildlife Service; National Marine Fisheries Service; California Department of Fish and Game; California Department of Water Resources; Suisun Resource Conservation District; and Delta Stewardship Council Science Program.

EN #4

Testing and Improving Techniques for Eradicating Non-Native Submerged and Floating Aquatic Vegetation from Delta Waterways – Delta Counties

Non-native invasive Submerged Aquatic Vegetation (SAV) and Floating Aquatic Vegetation (FAV) species have invaded large areas of the Delta and the invasion is continuing to expand and colonize new areas. Removing non-native SAV and FAV from Delta waterways will restore turbidity levels to favor native fisheries such as smelt and salmon. The current vegetation removal program administered by Department of Boating and Waterways includes herbicide application and mechanical harvesting for *Eichhornia crassipes* (Water Hyacinth), *Egeria densa* (Brazilian Elodea), and *Arundo Donax* (Giant Cane).

Both of these techniques are limited in their effectiveness for *Egeria densa*, one of the largest problems in the Delta. New techniques or species specific herbicides should be developed to combat *Egeria Densa*. Funding should be provided to support research efforts aimed at eradicating *Egeria Densa.*

Biological and Water Supply Benefits: Non-native invasive species such as Water Hyacinth and Brazilian Elodea grow rampantly and can deplete much needed nutrients from Delta waterways. These aquatic invasive non-native species competition for resources needed to sustain native plant species. The depletion of nutrients also leads to less turbid conditions which are detrimental to species like Delta smelt and Salmon smolts which use turbid water ways to evade predation by other fish and water fowl. Additionally, Delta farmers, recreational enthusiasts including boaters, and levee maintenance agencies must contend with clogged irrigation pumps and siphons and channels which are closed off by vegetation over-growth.

Integration: Environmental Restoration, Water Supply and Recreation.

Status: Hyacinth, Brazilian Elodea and Arundo Donax removal efforts are undertaken by local agencies on an as needed basis to maintain day to day functions. California Department of Boating and Waterways are currently appropriating approximately $6.5 million per year for removal efforts. Additional funds are needed to improve upon the removal efforts and also for research for more economical ways of non-native plant species removal.

Cost estimate: To be determined

Potential funding sources: Maintain current funding for DBW through State Budget, State bond funds Proposition 1E and 84

Sponsor & Contact Information: California Department of Boating and Waterways

FLOOD CONTROL PROJECTS

FC #1

Lake Isabella Dam Repairs – Kern County

Lake Isabella is Army Corps of Engineers (ACOE) project that controls the Kern River flows. The main dam has been found to have defects related to the geologic faults and soils in the area under the dam and flood management and water storage has been limited to the much older original dam upstream. The result has been increased flood risk to the Bakersfield area and loss of about 200,000 acre-feet of water storage on average annual basis. The proposed project to repair the dam has been funded through to the feasibility level. This project is the number one dam safety project in the U.S. under ACOE jurisdiction. The concept needing support is to *accelerate* the final design and funding of the repairs. The current timetable is that construction would not be complete until 2021 or nine more years of lost water potentially totaling 1.8 maf or with a dam failure exposing 300,000 Kern County residents to jeopardy of property and life.

Water supply benefit: 200,000 af/yr

Status: ACOE needs authorization and appropriation through WRDA

Cost estimate: $10 – 20 mil. Depending on selected alternative (from draft EIR)

Potential funding sources: WRDA, Bond funds

Sponsor: ACOE and Kern River Watermaster

FC #2

Lower San Joaquin River Regional Bypass Feasibility Study – San Joaquin County

Paradise Cut is a federal flood control bypass which was designed to carry up to 15,000 cfs of flood waters away from the urban areas along the San Joaquin River. It is currently the only bypass in the South Delta and connects the San Joaquin River to Old River and Grant Line Canal. The bypass was designed to divert flows in the San Joaquin River which exceed a four year storm, but due to sedimentation, the bypass currently carries only a maximum of 10,500 cfs which is less than the design flow. This proposed project involves improvements to Paradise Cut which will help to restore design flows in the Paradise Cut bypass and also expand it to accommodate additional bypass flows. The project would involve:

- Removing sediment which currently blocks the rock weir and reduces the bypass capacity (already scheduled for action by River Islands);
- Setting back levees along the north side of Paradise Cut and creating significant sustainable riparian habitat for an endangered riparian brush rabbit (already scheduled for action by River Islands);
- Widening of existing Paradise Weir:
- Constructing an additional weir at some location upstream of the current Paradise Weir;
- Construction of a bypass channel from the new weir to Paradise Cut of sufficient depth and with levees providing adequate flood protection for adjacent areas;
- Setback where appropriate the southern levees along Paradise Cut to accommodate increased flows resulting from the widened new weirs;
- Necessary dredging of Salmon Slough and Doughty Cut to safely transport increase Bypass flows into the larger interior Delta channels so that no redirected flood impacts result from new weir and increased Bypass capacity; and,
- Creation of temporary flood storage areas as an optional component to decrease peak flood events and to allow for queuing of flood flows into the proposed channels and into Paradise Cut thus minimizing downstream flooding impacts.

Flood Control Benefits: Reduced flood stages and flood risk for islands downstream of the Bypass in the Central Delta and for the Cities of Stockton, Lathrop, and Manteca.

Integration: Opportunities for Environmental Restoration of riparian habitat along set back levees.

Status: The Project is currently being evaluated in the Lower San Joaquin River Feasibility Study which is being jointly funded by the USACE, DWR, SJAFCA, and other local, agencies.

Cost estimate: To be determined.

Potential funding sources: Federal Appropriations, USACE crediting, State bond funds Proposition 1E and 84, Local Costs Share through SJAFCA, and/or local Reclamation Districts.

Sponsor & Contact Information: San Joaquin Area Flood Control Agency (SJAFCA)

FC #3A

Delta Levee Improvements, Emergency Preparedness – San Joaquin County

This composite project includes levee improvements in the western Delta islands, emergency preparedness in advance of levee failures, and the feasibility of dredging in Delta channels to improve flood-flow conveyance and operation of agricultural siphons and pumps. Details are provided below.

- Levee improvements on the western Delta islands (Sherman, Twitchell, Jersey Islands which are publicly owned and other critical islands such as Bethel, Hotchkiss, Bradford) for protecting water supplies and the ecosystem, and on key infrastructure islands (Victoria Island with State Route 4 and water facilities, Jones Tract and Woodward Island with water supply facilities and railroads, Sherman with State Route 160)

- Establish more emergency supplies on island sites in case of levee failures, including stockpiles of rock suitable for levee repair at strategic locations.

- Emergency Planning: Desktop and full field emergency exercises among state and local agencies.

- Streamline the process used by the Department of Water Resources to administer the Delta Levee Subventions and Special Projects Programs.

- Analyze the feasibility of dredging critical locations of Delta channels to improve flood-flow conveyance and improve operations for private agricultural siphons and pumps, and provide spoils material which could be used to reinforce levees. Dredging would be conducted in the center of channels to avoid impacts to wetland plants and riparian habitat. Dredging would be conducted using either a sealed clamshell dredge or hydraulic dredge in an effort to minimize any environment impacts. The project could be used to evaluate the feasibility of instituting a more comprehensive dredging program throughout the Delta on a periodic basis.

Flood Control Benefits: Improved levees and increased channel capacities reduce flood risk to Delta islands, which support agriculture and key infrastructure such as transportation highways, natural gas transmission and storage, power transmission lines, and water supply conveyance facilities. Emergency stockpiling of levee material decreases logistical response time should levee failures occur.

Integration: Strategic improvements to Middle River channel capacities and levees could provide additional water supply security in the event of a levee failure and reduce water level impacts to the South Delta. Periodic dredging of Delta channels also improves the efficiency of agricultural pumps and siphons thus reducing operating costs and improving irrigation efficiency.

Status: The Delta Aqueduct Protection Project, designed to improve levees on Woodward, Orwood, Palm, Upper and Lower Jones and Lower Roberts Islands is partially funded and nearing completion. Total project cost is $41.1 million with a local share of $6.1 million covered by East Bay Municipal Utility District. This project could be used as a funding model for additional projects.

Cost estimate: Levee repair and construction costs to be determined

Potential funding sources: State bond funds Proposition 1E and 84, State Levee Subventions Program, local cost share through Reclamation Districts and beneficiaries; EBMUD, PGE, Caltrans, County Road Districts, and others.

Sponsor & Contact Information: San Joaquin County Department of Public Works, John Maguire (209) 468-3000

GROUNDWATER RECHARGE PROJECTS

GR #1

Madera Irrigation District Water Supply Enhancement Project – Madera County

This project involves the *accelerated* construction and operation of facilities to convey and bank up to 250,000 acre-feet of surface water and then recover up to 90% of the banked water for beneficial use in Madera ID, a Friant Division CVP contractor. Currently banking is capped at 55,000 af annually and withdrawal capped in dry years at 55,000 af. Federal CVP (Friant) and Corps of Engineers (Hidden and Buchanan) are the potential water sources currently; the project could reach the 250,000 af goal sooner and possibly accept other local water (Kings flooding?) with additional infrastructure. This groundwater bank has the potential to assist in stabilizing groundwater levels in a fairly large area of the San Joaquin Valley. This project is in the Madera IRWMP.

Water supply benefit: 55,000 af potential in dry years; this project can substantially assist in reducing declines in groundwater levels in Madera County, improved groundwater levels reduce energy costs and their attendant carbon footprint

Integrated benefits: The project will use very high-quality water thus improving groundwater quality. Much of the project area is not, nor has not been farmed; therefore existing natural habitat and

potential new habitat will add environmental benefits. Finally, any flood water used prevents it from reaching the Delta, thereby reducing those flood threats

Status: Environmental documentation and all permits, including ESA completed, ROD signed July 2011; water banking in late 2011; groundbreaking for infrastructure 2012

Cost estimate: $90 mil. (MID has put up $45 mil. in bonds)

Potential funding sources: Congressional authorization for $22.5 mil; ongoing expansion may include: USBR; State Bond funds, continuing local bonding if financial capacity exists

Sponsor: Madera Irrigation District

GR #2

Semitropic Water Storage District Water Banking Projects (Semitropic Pond-Poso) – Kern County

This project involves *accelerated* improvements to the Semi-Tropic Water Storage District's recharge facilities to provide up to an additional 65,000 acre-feet per year of direct recharge and 66,000 acre-feet of recovery capacity from the District's existing groundwater bank; linked with Cross Valley Canal to accept either State contract water or CVP (Friant) surplus water. The facilities are not near a major river system subject to flooding therefore they are a candidate area for recharge of flood flows conveyed only through the major water distribution systems, state or federal. The project could be linked with Stanislaus County pipeline projects. The project is included in the Poso Creek IRWMP.

Water supply benefit: Improved groundwater levels in northern Kern County, part of a shared banking program that includes exchanges with Bay Area and southern California agencies. Local benefits are to mostly agricultural, small cities and rural residential groundwater users.

Integration: Improved water groundwater quality. Recharge ponding areas provide wildlife habitat when operating. Some flood management benefits if conveyance can be arranged.

Status: Further planning and design underway, received implementation funds from Prop. 84 IRWMP and USBR

Cost estimate: $ 8.5 mil.

Potential funding sources: bonds, USBR

Sponsor: Poso Creek IRWM JPA

GR #3

Mokelumne River Water Storage and Conjunctive Use Project Feasibility Study – San Joaquin County

The project involves financing a feasibility Study for a groundwater storage/conjunctive use project in the Eastern San Joaquin Groundwater Basin (ESJGB) that would appropriate wet year water from the Mokelumne River for beneficial use in Eastern San Joaquin County. This is a priority project identified in

the Eastern San Joaquin County IRWMP and the Eastern San Joaquin Integrated Conjunctive Use Program.

Water supply benefit: Reduced groundwater overdraft in Eastern San Joaquin County and the potential to provide additional water supply benefits to regional groundwater banking partnerships.

Integration: water supply reliability, conjunctive use, groundwater quality improvement, improved flood management on the Mokelumne River and potentially the Calaveras River through improved reservoir re-operation, inter-regional water supply benefits, seasonal migratory water fowl habitat.

Status: Feasibility Study Authorized by Congress in 2006 (S.203) for up to $3.3 million with a minimum local cost-share of 50%, Bureau of Reclamation completed Appraisal Study in 2007 which concluded that there is a Federal interest in the Project, San Joaquin County entered into an agreement with Reclamation in 2009 for the purpose of determining how local cost share dollars would be credited per the Authorization language, Reclamation is currently updating the Plan of Study which should be finalized in 2012, $483,000 Federal Appropriations through Reclamation since 2009. Identified as top legislative priority by San Joaquin County, Stockton East Water District continues to pursue up to $33.5 million for on-farm and distribution related components for groundwater recharge authorized by Congress through the US Army Corps of Engineers for the Farmington Groundwater Recharge Program, submitted Prop. 84 Inter-Regional Planning Grant (Mokelumne Watershed Integrated Sustainability Evaluation {WISE} Program) in partnership with other Mokelumne River Stakeholders including environmental NGO's to work through Mokelumne watershed and inter-regional conjunctive use issues in Eastern San Joaquin County, and State Prop. 13, 50, and 84 Recharge/IRWMP/Local Groundwater Assistance and implementation grants have been and will be submitted.

Cost estimate: Federal Feasibility Study: Federal Share ~$2.8 million, Non-Federal Share $3.3 million, ~$1 million for Mokelumne WISE Program from Prop. 84 and locals, ~$32 million for SEWD Farmington Program and recharge projects,

Potential funding sources: Federal Appropriations, State Grants, Regional and Inter-Regional Partnerships, Bonds, Local sources.

Sponsor: Northeastern San Joaquin County Groundwater Banking Authority

GR #4

McMullin Recharge - Upper Kings Water Authority – Fresno County

This is a groundwater recharge project in the Raisin City area of central Fresno County. It is near the junction of the North Fork Kings River and the James Flood By-pass. The project has had exploratory drilling to understand the geology (AB 3030) and feasibility of recharge. The results were satisfactory for most of the area under consideration except for the northwest corner of the investigation. It is in the Upper Kings IRWMP. This project is the first in a series in the area that could potentially recharge in excess of 500,000 Af cumulatively.

Water supply benefit: Recharge of a large area of overdrafted groundwater in the Kings groundwater basin. The first phase anticipates up to 14,000 af of recharge (average loss from Kings River flooding is in excess of 500,000 af)

Status: Trial recharge was conducted by a member of the McMullin Recharge Group of the Kings River Conservation District during the 2011 wet year. The trial was to quantify supply benefits and evaluate the impacts to the land and crops; the final results are pending but were successful in using dormant permanent crop areas as well as open agricultural land for recharge. The project recently received notification that it will receive $5.0 million for the first phase facilities from the Prop. 1E "Flood Corridor" funds.

Cost estimate: $14 mil for buildout.

Potential funding sources: Bond funds, DWR, USDA

Sponsor: Upper Kings Water Authority

WATER QUALITY PROJECTS

WQ #1

North Valley Regional Recycled Water Project Reconnaissance Study – Stanislaus County

Stanislaus County, the Cities of Modesto and Turlock, and the Del Puerto Water District are seeking Title XVI (title sixteen is Bureau of Reclamation project funding authority) funding to develop and establish the North Valley Regional Recycled Water Project. At full build-out, project sponsors estimate they can recycle 31.25 TAF per year for agricultural use potentially including in Western Stanislaus County, a water short area impacted by the uncertainty of Delta supplies. Roughly one third of this water is currently discharged to the San Joaquin River and two thirds is applied to land overlying an overdrawn aquifer. The goal is to remove the water from the San Joaquin River and beneficially re-use the entire treated water source.

Water supply benefit: 31,000 af (ag use only)

Status: Authorization needed in Congress under USBR Title XVI

Cost estimate: $150 mil.

Potential funding sources: USBR Title XVI; SRF (low interest loans)

Sponsor: City of Modesto

WQ #2

San Joaquin River Salinity Management Program - Grassland By-Pass – Fresno and Merced Counties

This project involves *accelerating* and increasing funding for San Joaquin River Salinity Management Program, which improves water quality in the San Joaquin River and Delta. Implementation of this

Program has historically been partially supported through the United States Bureau of Reclamation to help meet the federal government's obligation to provide drainage service to lands within the San Luis Unit of the Central Valley Project, primarily within the Grassland Drainage Area (the Valley portion of the Panoche Creek watershed). The Program reduces the discharge of saline agricultural drainage water to the San Joaquin River system by simultaneously reducing the volume of drain water produced (through source control activities such as reduced water use) and managing the drain water that does get produced (through drainage reuse and treatment, including irrigation of salt tolerant crops) on 6,000 acres. The project significantly reduces the volume of agricultural subsurface drain water discharged to the San Joaquin River. In order to comply with water quality standards, drainage discharge from the Grassland Drainage Area must be eliminated by 2019 – which is also the ultimate goal of the Program. The project is in the Westside IRWMP.

Water quality benefits: Improved water quality in the San Joaquin River; salty drainage discharge to the River has already been reduced by 77%

Integration: Water Conservation, irrigation efficiency, reduced groundwater pumping, upland habitat in some reuse areas

Status: ongoing; drainage treatment pilot to begin in 2012

Cost estimate: $107 mil.

Potential funding sources: USBR ($23 mil. To date); State bond funds $35.5 mil. To date local water district investment is $22.8 mil.

Sponsor: San Luis and Delta-Mendota Water Authority

WQ #3

Water Quality and Water Level Barriers in Sacramento-San Joaquin Delta – San Joaquin County

Currently, four temporary rock barriers are constructed seasonally in South Delta channels at the following locations, Middle River, Old River, Grant Line Canal, and at the head of Old River. Three of the barriers are operated to partially mitigate for lowered water levels caused by pumping at the SWP and CVP export facilities. These three barriers can also be operated to improve water quality in southern Delta channels, also as mitigation for impacts on water quality caused by the export projects. The fourth barrier, known as the Head of Old River Barrier, is intended to protect fish including out-migrating salmon. The four barriers should be installed and operated as needed each year and eventually made permanent. Additional improvements such as low-head pumps should be evaluated and tested to determine how best to create net flows in the channels in order to control salts and meet water quality standards and beneficial needs. Further, re-circulation of flows pumped though SWP/CVP facilities and into the Lower San Joaquin River using existing and proposed interconnects could be evaluated and included as part of an overall program to address South Delta water quality and level issues.

Water quality benefit: Maintain sufficient net flows to control salt in channels in order to meet water

quality objectives which are permit terms of the projects, or to improve water quality even if objectives are not met. Such control should benefit local dischargers, including agriculture dischargers, City of Tracy, Mountain House Community Services District, City of Manteca, City of Lathrop, and the City of Stockton by facilitating compliance with discharge requirements, to the benefit of agricultural, environmental, and other beneficial uses.

Integration: Improve water levels in the South Delta to mitigate adverse impacts caused by export projects, prevent entrainment of juvenile Chinook Salmon and other species of concern, and assist responsible parties in meeting in-Delta water quality objectives.

Status: Annually installed on a case-by-case basis, this project needs permanent authorization for annual installation until further permanent Delta improvements negate the need. Additional enhancements such as low-head pumps and recirculation need to be further explored and pilot tested.

Cost estimate: $13.2 mil.

Potential funding sources: DWR, USBR, grants, bond funds

Sponsor: California Department of Water Resources

WATER SUPPLY PROJECTS

WS #1

Temperance Flat – Fresno County

Temperance Flat Storage Facility is an augmentation of water storage above Friant Dam designed to approximately double the capability to capture San Joaquin River flows in order to conserve sufficient water for a downstream cold water fishery as well as restoring some reliability of agricultural supplies to the Friant Unit of the CVP. The new yield has been estimated to be 120,000 to 150,000 af from the watershed and potentially double that if integrated with a Delta solution that allows wet year pumping opportunities and a San Joaquin Valley surface groundwater exchange program. While yield may be low the main benefit is the ability to manage for cold water and for conveyance (timing) especially to conjunctive use areas and groundwater banking projects. Currently Millerton Lake must be evacuated quickly to make room for snow melt which causes significant water loss and limits groundwater recharge opportunities. Temperance Flat would provide the ability to better control cold water for salmon restoration in the River. Other broad benefits are flood control, water quality improvements, recreation and emergency water supply availability. The existing Millerton, by the way of comparison, is half the size of Pine Flat on the Kings River which has almost the exact same watershed yield of an annual average of 1.2 million af.

Water supply benefit: Water storage operational flexibility and 120,000 to 300,000 af of yield.

Integration: Water for cold water fishery, flood management.

Status: Feasibility study by USBR

Cost estimate: $2.5 - 3 billion

Potential funding sources: USBR authorization and appropriation, bond funds, local bonding for local benefits, if any

Sponsor/Responsible Agent: USBR Mid-Pacific Region – Erika Kegel

WS # 2A

Patterson Irrigation District Fish Screen Intake and Pipeline Project – Stanislaus County

The project involves constructing a fish screen, oversized pipeline (beyond the needs of the District) and associated pumping plant, connecting Patterson Irrigation District's (PID) "Main Canal" to the Delta Mendota Canal (DMC). The DMC in turn connects to San Luis Reservoir through O'Neill Forebay which then can be used to store and deliver water to many areas south. The project will provide opportunities to the San Joaquin River Restoration Program and re-circulation flows, District partners in the San Luis and Delta-Mendota Water Authority, regional water recycling projects, and downstream recharge projects. The project is an opportunity for a "regional" water supply management activity that can be used to re-direct flood flows (or other available water supplies) and keep them from damaging the Delta area.

Water supply benefit: The potential is to transfer flood flows (from SJR to DMC); to assist with recirculation goal of SR River Restoration Program or other transferrable water or potential use of these supplies for groundwater recharge projects noted herein.

Water Conservation: New facilities as a result of this project would further reduce conveyance losses and incorporate efficient pumping technologies, making more water available to be distributed to places of need.

Groundwater Management: Additional water supplies made available through this project would reduce the dependence on groundwater wells to offset unreliable surface deliveries on the west side of the San Joaquin Valley.

Water Recycling: This project may provide a feasible conveyance option for current water reuse and recycling efforts looking to convey water from eastern San Joaquin Valley municipalities for agricultural use on the west side.

Integration: Flood management and high quality water used for groundwater recharge can improve groundwater quality

Status: Fish screen construction is completed; pipeline project needs a feasibility study and design.

Cost estimate: $14 mil. for fish screen (already obligated); $20-35 mil. estimated for pipeline

Potential funding sources: USBR; DWR bond funds; local agencies

Sponsor: Patterson Irrigation District. Contact: Peter Rietkerk, General Manager (209-892-6233)

WS #2B

West Stanislaus Pipeline and Fish Screen Project – Stanislaus County

This project involves improvements to West Stanislaus Irrigation District (WSID) main canal system, pipeline, pump station, fish screen and modifications to two existing lift stations on the main canal to connect WSID's delivery system to the Delta Mendota Canal.

Water supply benefit: Same as PID above, flood flows, other available supplies; also benefits recirculation goal of SJ River Restoration, send water into San Luis for use in recharge projects or direct use in numerous areas with an annual benefit of roughly 80,000 AF.

Other benefits: This project will link well with the flood management planning efforts by the State Department of Water Resources, the U.S. Corps of Engineers and others. This project will also link well with subsequent floodplain and riparian restoration projects at/near the Districts diversion on the SJR near the San Joaquin River National Wildlife Refuge.

Status: The District currently has funding from DFG in the amount of $2.6 mil through the Ecosystem Restoration Program for final design, environmental compliance and permitting of fish screen; awaiting funding for construction of pipeline; the pipeline project is fully designed and is a shovel ready project.

Cost estimate: $26.2 mil. for fish screen; $14 mil. for pipeline. Total: $40.2 mil.

Potential funding sources: F&G; USBR, AFSP, USFWS, NMFS, DWR bond funds

WS #2C

Banta-Carbona Irrigation District Pumping Plant and Pipeline Project – San Joaquin County

Construct a 400 cubic feet per second (cfs) pumping plant behind an existing fish screen on the San Joaquin River, replace three existing pumping plants with 21,000 feet of 120-in. diameter pipeline, rebuild existing 8,500 feet of 200 cfs lift canal to 400 cfs, replace 4 existing pumping plants with two 400 cfs pumping plants and construct 6,500 feet of 72-in. pipeline connecting BCID's Main Lift Canal to the Delta Mendota Canal (DMC). In conjunction, build 10 MW of renewable energy projects adjacent to project for use in pumping.

Water supply benefit: Potential to wheel 210,000 af of water from SJR to DMC of eastside to Westside transfers; potential to assist with recirculation goal of SR River Restoration Program, potential use of flood water for groundwater recharge projects noted herein. Potential wheeling capacity is dependent on available capacity in the DMC.

Status: Needs a feasibility study

Cost estimate: $150 mil. for pump/pipeline/lift canal; $50 mil. for renewable energy projects

Potential funding sources: bonds, USBR

Sponsor: San Luis and Delta-Mendota Water Authority

WS #3

Friant-Kern Canal Reverse Flow Feasibility Study - San Joaquin River Restoration – Fresno to Kern County

This project proposes to construct three pumping plants along the Friant Kern Canal (FKC) in order to lift water upstream in the FKC from the intertie with the Cross Valley Canal (CVC) as far north as the Delano-Earlimart Irrigation District (Lake Woollomes Check). It is authorized by the San Joaquin River Restoration Act. The goal is to take better advantage of the San Joaquin River re-circulation capabilities using the Cross Valley Canal as well as conveying any flood water that can be diverted from the north by using the California Aqueduct. This project would aid in maximizing existing or making proposed groundwater recharge programs operationally and financially viable. Numerous new recharge projects are under consideration in Kern and Tulare Counties that could benefit from improved conveyance that can move water back and forth across the Valley.

Water supply benefit: Recharge of Friant area groundwater basins served by the project, improved reliability of existing surface water supplies and conjunctive use.

Integration: Recharge projects can mitigate flooding, improve groundwater quality and provide interim habitat.

Status: Feasibility study

Cost estimate: $17 mil.

Potential funding sources: USBR, bond funds

Sponsor: Friant Water Authority

WS #4

Water Conservation - Water Use Efficiency – San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern Counties

Increase funding for Bureau of Reclamation's and USDA programs to provide financial assistance to irrigation districts and water users for water management improvements that accelerate the implementation of conservation activities in potential drainage impaired or non-recoverable soils (won't recharge usable groundwater). These grants provide tools to water users to better manage their water, and thus conserve by diverting less, or using the water more efficiently within their service area.

Water supply benefit: Demand management strategy, can reduce groundwater overdraft and stretch limited surface water supplies.

Status: On-going

Cost estimate: Annual allocation from the BOR and USDA AWEP would be expanded until such a time the accepted optimum conservation goal has been reached

Potential funding sources: USBR, USDA, bonds

Sponsor: USDA-NRCS, CA DWR

WS #5

Friant-Kern and Madera Canals Capacity Correction – Madera, Fresno, Tulare, Kern Counties

This project is designed to correct capacity constraints that have developed on the Friant-Kern Canal (FKC) and Madera Canal (MC) as a result primarily of land subsidence and increased roughness in both lined and unlined segments. The project could consist of a variety of actions including raising the FKC's concrete liner in places and modifying structures and appurtenances (such as turnouts and bridges). Corrections to canal roughness or sedimentation could include physical modifications to the canal prism.

Water supply benefit: Increased flow capacity to allow for timelier and higher flow deliveries of available water supplies, particularly flood waters.

Status: Feasibility study

Cost estimate: $35 mil.

Potential funding sources: USBR, bonds, users

Sponsor: Friant Water Authority

TOTAL POTENTIAL INVESTMENT <u>WITHOUT</u> TEMPERANCE FLAT AND ISABELLA DAM CORRECTION = 1 BILLION; WITH TEMPERANCE FLAT AND ISABELLA THE RANGE IS 6 TO 8 BILLION.

NEXT STEPS – UPON APPROVAL TO PROCEED WITH THIS RANGE OF PROJECTS, THE NEXT STEP IS TO DEVELOP MORE REFINED CRITERIA AND A REVIEW PROCESS TO FIND THE PROJECTS WITH THE BEST RETURN ON INVESTMENT FOR ALL OF THE PARTICIPATING COUNTIES/AREAS, WHILE AT THE SAME TIME DEVELOPING AN OUTREACH PROCESS FOR CHAMPIONING THE IMPORTANT POLICY/PRECEDENT SETTING PROJECTS.