

Upper San Joaquin River Basin Storage Investigation Workshop Summary - DRAFT

Workshop # 5, April 30, 2003

Introduction

This document summarizes Workshop # 5 of the Upper San Joaquin River Basin Storage Investigation (Investigation). This series of workshops presents opportunities for stakeholders to hear about Investigation analyses and results, and provide comments to the project team. Charles Gardiner, the meeting facilitator, reviewed the day's purpose and objectives, agenda, and participation principles. Agenda topics included:

- Investigation Overview
- Conjunctive Use and Groundwater Storage
- Surface Storage and Options Screening
- Alternatives Formulation and Feasibility Study Workplan
- Next Steps

Participants' comments and questions (*hereafter presented in italics*) are listed for each discussion topic, followed by responses provided by Investigation team members.

Investigation Overview

Jason Phillips, Reclamation's project manager, provided a summary of the Investigation, including a description of the CALFED goals. (See slides for the presentation on this and other meeting topics). The summary information had been presented at previous workshops and was therefore discussed briefly. Since the last workshop, Congress authorized Reclamation to prepare a feasibility study for new storage in the Upper San Joaquin River Basin and several other CALFED storage projects. The Investigation is currently completing the Phase 1 Appraisal Study, and will continue into Phase 2, which will include preparation of a Feasibility Study and associated Environmental Impact Report/Environmental Impact Statement.

The planning approach for Phase 1 was described briefly. Since the last workshop, the approach has been modified to address the identification and screening of potential conjunctive use projects (discussed in a later agenda item) and continuation of the Investigation into a feasibility study.

Participants' comments and questions (*hereafter presented in italics*) during this portion of the workshop included:

- *Should more emphasis be put on using the system inerties for delivering water for urban use? It is still necessary to explore how the alternatives in this Investigation will facilitate exchanges and urban water quality improvements. More effort will be spent on this during the feasibility study.*

- *Were the two sites authorized by the Corps of Engineers (and eliminated from further consideration) analyzed for the same purposes that the Investigation did?* The Corps evaluated the sites for flood protection and water supply. There are no proposals to reconsider them for any other purpose.

Conjunctive Use and Groundwater Storage

Bill Swanson led a discussion of how conjunctive use and groundwater storage projects will be considered in the Investigation. Several comments had been received, both written and at previous workshops regarding this issue. Previous comments were related to questions on how the Investigation will consider conjunctive use and suggestions that conjunctive use be included as an alternative to surface storage options.

The Investigation will apply an approach for evaluating conjunctive use options that is consistent with CALFED Integrated Storage Investigation (ISI) Conjunctive Management Program principles. A theoretical analysis will be made on existing, without-project, and with-project conditions to identify the potential for conjunctive use projects. This analysis will provide information on potential opportunities for conjunctive use, but will not constitute a project-level analysis. Consideration of conjunctive use as part of alternatives will require more specificity.

The Investigation team will review potential projects that have been identified by others and apply a set of screening criteria to determine how the projects could help achieve objectives of the Investigation. This will require coordination with the CALFED Conjunctive Management Program and potential project proponents. Investigation team members will be in contact with several stakeholders over the next few months to obtain details.

A parking lot item, “Determine how ‘Facilitate Exchanges’ will be measured,” resulted from discussion during this portion of the workshop. Comments and questions from participants included:

- *How does the assumption of “no transfers” factor into the ISI program?* The CALFED ISI Conjunctive Management Program will be implemented consistent with a set of principles that address major concerns regarding the development of groundwater projects. The principles state that projects would have local planning and control, be implemented voluntarily, provide a priority for in-basin water needs, provide compensation for out-of-basin transfers, and be supported with Basin-wide planning and monitoring.
- *Would potential modifications in SWP operations affect how the ISI Program is run?* The State Department of Water Resources, the ISI Conjunctive Management project lead, works with locals in defining local conjunctive use programs while considering SWP operations.
- *Are exchanges and conjunctive use part of CALFED?* Yes. The CALFED Record of Decision (ROD) identified a state-wide goal for 500,000 to 1 million acre-feet of additional groundwater storage through the development of conjunctive use projects. The CALFED Integrated Storage Investigation (ISI) Conjunctive Management Program was established to assist local entities develop conjunctive use and groundwater storage projects. The ROD

also stated that new surface storage in the Upper San Joaquin River Basin could facilitate additional conjunctive use and exchanges that provide high quality water to urban areas.

- *Is there a nexus between the level of detail needed for the Investigation and identifying the Least Environmentally Damaging Practicable Alternative?* The Investigation team is in the initial stages of defining a range of reasonable and practical alternatives. The Feasibility Study will identify those alternatives that satisfy several evaluation criteria, including the least environmentally damaging alternative.
- *Will the Investigation do its “own thinking” regarding conjunctive use projects that could be evaluated, or just include projects that stakeholders bring?* The Investigation team is coordinating with the ISI Conjunctive Management Program and stakeholders to identify potential projects.
- *How do we address the water ownership issue for conjunctive use projects?* Ownership of conjunctive use projects and the water supply created may raise institutional issues. This is some of the information about each potential groundwater project that will help the Investigation team determine if a project could be part of the alternatives. The Investigation will also consider the amount of water developed at Friant Dam in the evaluation of conjunctive use projects. Potential cost-sharing would be proportional to the amount of water available toward meeting study objectives.
- *Publishing information on conjunctive use projects and constraints could help to address existing misunderstandings about conjunctive use opportunities.*
- *How do benefits/costs justify expansion?* The purpose of a feasibility study is to determine if a potential action is justified. This determination will be based, in part, on an analysis of economic costs and benefits.
- *Can we consider conjunctive use from “top down,” i.e., determine yield and then identify specific opportunities?* Specific project opportunities will be considered consistent with the CALFED approach, which is based on input from local project proponents. The emphasis on locally-planned and controlled projects in the CALFED program was established in consideration of lessons learned over that past several years. However, to gain some insight on the extent of potential conjunctive use opportunities, the Investigation team has completed a theoretical evaluation that is based on water availability only, which was presented in a later portion of the workshop.
- *What is the process for incorporating conjunctive use projects into the Investigation?* The Investigation will identify if and how groundwater storage projects could be included in the Investigation storage alternatives. The first step is to identify the details of how each groundwater storage project would work, where water would come from, and how much might be available to meet the Investigation objectives.
- *If some conjunctive use projects are only economical with new storage, how do you calculate the economic benefits and costs? Will these projects be linked to expansion?* Conjunctive use

projects that have local support for consideration in the Investigation will be included as potential storage options. It is possible that some conjunctive use projects would only be effective when linked to the operation of additional surface water storage. Investigation alternatives may include combinations of surface water and groundwater storage options. Costs and benefits will be calculated for complete alternatives.

The Investigation Team used output from the CALSIM Benchmark for the study to conduct a theoretical analysis of recharge opportunities. Walter Bourez presented results from an analysis of flood releases that could potentially be diverted to conjunctive use projects, if the projects existed. Several “screens” were applied to account for conveyance limitations and the likely ability to divert water to recharge projects during very wet conditions. The theoretical analysis also considered how much additional water might be recharged if a hypothetical re-operation, based on perfect foresight, were implemented.

- *How do conveyance capacity assumptions apply to projects that would receive water from the river?* The river could also convey water to groundwater storage projects, but it would not increase the theoretical opportunity for groundwater storage.
- *Are both in-lieu and basin recharge considered?* Yes. The analysis considered total recharge rate, which could represent both in-lieu and direct recharge projects. For the purposes of the theoretical analysis, the distinction is not significant.
- *Did you consider conjunctive use programs or projects that are already occurring?* The effect of existing projects is included in the Benchmark simulation. Potential additional conjunctive use projects will be considered for inclusion in the without-project condition or in project alternatives.
- *What assumption is made regarding meeting Exchange Contractor demands?* The CALSIM model includes the Friant Division, all other CVP, all SWP, and many locally-owned facilities and their respective demands. The Benchmark simulation includes the diversion of some flood flows released from Friant Dam at Mendota Pool. The post-processing theoretical analysis of conjunctive use opportunities did not re-run CALSIM to determine potential impacts to Mendota Pool water supplies. This potential impact will be described in the documentation of the theoretical analysis.
- *What are the flows and chronologic increments considered in the theoretical analysis?* The model uses a monthly time step analysis. A sensitivity analysis (discussed below) shows that using a daily time step does not significantly alter the flood flows available for storage.
- *Does the model factor in recharge before flood flows?* The theoretical analysis was a post-model analysis of the volume of floodwater that could be recharged. This would have the effect of reducing flood flows to downstream areas.
- *How does the Wetness Index work?* The wetness factors help simulate the reduction in demand for Friant water that occurs when other local water is available for recharge. The benchmark model used a wetness index to indicate when demand for Class 2 and Section

215 water would be reduced due to the availability of water from multiple sources. The index was developed from a review of historical operations. Class 2 and Section 215 water is generally used for conjunctive use projects; therefore, the wetness index was used to adjust the theoretical recharge water demand.

- *In reality, flood control is a determining factor during wet years. Decision makers determine whether the basin is full before accepting 215 water.* The wetness index was developed to reflect the operational effects of these local decisions.
- *What are minimal in-stream flow allocations?* The Benchmark simulation is based on existing in-stream flow requirements, which include releases for downstream riparian water rights diversions.
- *Pre-releasing water in a dry year could result in water being unavailable later for required fish flows.* The effects of operations on ecosystem conditions can only be evaluated when compared to requirements of a specific restoration plan. The Investigation is not developing a restoration plan, but will need a plan to estimate environmental benefits of alternatives. The Investigation team is identifying how operations could affect the availability of water in successive years.
- *An additional analysis of potential recharge is needed.* The project team is coordinating with the CALFED ISI Conjunctive Management Program and stakeholders to identify specific potential groundwater storage projects. The team will continue discussions with the stakeholders to develop additional details about each project.
- *The recharge potential equals put, not take.* The average annual recharge potential is equivalent to a storage number as opposed to a yield, i.e., this estimate measures how much could be put into storage on an average annual basis. Project specific details would likely affect the “take”, or yield, of a project.
- *Can we consider groundwater storage as an additional reservoir?* At this point, the Investigation has only determined how much water could be put in groundwater storage if the necessary facilities and storage projects were available. With additional information about specific projects, groundwater storage projects could be options within a storage alternative.
- *When assessing conveyance capacity, geographic location is a consideration.* The conveyance “screen” considered headworks capacity at the Friant-Kern and Madera canals. It did not consider the effect of capacity reductions along the Friant-Kern Canal.
- *Does the capacity constraint account for existing operations and does the model consider available combined capacity?* The theoretical analysis considered combined available capacity in the Friant-Kern and Madera canals in any given month.

Participants suggested that future evaluation consider the following issues: 1) how to recover water from projects located near a river system, 2) the size of the recharge area, 3) the outcome

of incorporating future projects and hydrologic conditions into the model, 4) the benefits of future projects, and 5) the effects on environment and geomorphology. The Investigation team emphasized that these types of issues would be evaluated with specific projects that would be included as storage options.

Surface Storage Options Screening

Bill Swanson reviewed the process of screening the 16 surface storage sites and the types of surface storage options: 1) San Joaquin River Upstream of Friant Dam, 2) Exchange with Millerton Lake Water, and 3) Off-Canal storage. The Enlargement of Pine Flat was dropped based on an indication of no interest from the potential non-Federal sponsor, and the Enlargement of Kerckhoff was added to the Temperance Flat options. The Team is also monitoring the progress of a study to enlarge Mammoth Pool.

The project team made first cost estimates for retained sites, factoring in listed items, unlisted items, contingencies, mitigation, along with investigations, design, and construction management. (See slides) Currently, Yokohl Valley Reservoir is the only site that includes land and easement costs.

Participants would like to see future evaluations on the costs of inundating housing. Comments and questions on surface storage option screening included:

- *Is the Mammoth Pool enlargement being studied by Friant and SCE a recommendation from the Friant/NRDC process? Yes.*
- *The potential impacts to the burrowing owl and other species must be considered for both surface and groundwater storage projects. Environmental impacts to specific species will be evaluated in the EIS.*
- *Do the Temperance Flat estimates consider the loss of existing storage at Millerton? Yes, however, the development of any new dam also results in the creation of new dead storage. An estimate of dead storage was included in the storage capacity vs. yield chart.*
- *Does the analysis assume that Friant releases do not make it past the Mendota Pool? The single-purpose evaluations for river restoration and water quality were designed to identify the amount of water supply at Friant Dam that could be developed with storage options. No changes to the operational logic of CALSIM were made; therefore, water that reaches Mendota Pool from the San Joaquin River would be available to meet Mendota Pool demands.*

Modeling Update

Yung-Hsin Sun presented results from a set of sensitivity analyses that focused on monthly versus daily time steps, off-stream pumping rate assumptions, restoration flow patterns, and carryover operations. These evaluations were suggested at

Workshop #4 in response to results from single purpose evaluations. Assuming that canal capacity is the only limitation, the analyses found that carry-over operations will have a significant effect on results of average annual yield. Time steps, off-stream pumping rates, and the restoration pattern have minor effects on average annual yield for project objectives. The next step is to define risk associated with specific project operations.

Participant questions on the sensitivity analyses include:

- *Did the model incorporate other limitations, i.e., river conveyance capacity?* The river presents a less sensitive system resulting in a reduced difference between daily and monthly data.
- *Do different carryover operations have similar effects?* Carry-over requirements tend to reduce the average annual (supply) yield of additional storage projects. The trend indicates the smaller the storage facility or the longer the carryover objective (enough water for 3 years vs. 2 years), the more significant the carryover impact.
- *Can we employ “reverse mathematics” to assess how carryover affects assumptions, e.g., assume a 1% flood event to identify flood control and spill retention benefits? If the event size changes, how much storage space do we need?* The analyses completed to date have not modified the flood control rules, but all show that additional storage results in greater flood control. The optimization analysis suggested would require several alternative flood evaluations in combination with water supply operations. This level of evaluation is beyond the scope of the Phase 1 Investigation. As the Investigation proceeds into Feasibility Study, the alternatives will be strongly affected by operational assumptions. The important issue is to identify operational rules that are based upon risk analysis and to determine a reasonable basis for defining the carryover objective.
- *Was carryover water released during floods?* Yes, in some instances. The analysis showed that, using the same flood control rules and applying carryover requirements results in more frequent flood releases than an operation with no carryover requirements.
- *When carryover is lost, is the long term benefit gone?* Yes, part of the yield is gone.
- *Will carryover factor into the Feasibility Study cost/benefit analysis?* Yes, operational assumptions, particularly annual vs. multi-year, will be an important consideration in the alternatives.

Bill Swanson defined functional equivalents as: **“Storage options that provide additional water supply at Friant Dam to support CALFED objectives for Upper San Joaquin Storage.”** The CALFED ROD and regional needs define the fundamental objectives of functional equivalents as increasing water supply for a variety of purposes, flood control, and hydropower.

Participants expressed interest in seeing future, detailed evaluations that considered regional costs and benefits. Their concerns and questions about functional equivalents include:

- *Is the cost of water considered in the functional equivalent equation?* No. Economic analyses to be conducted, as part of the Feasibility Study, will help develop alternatives in an incremental manner.
- *Does water supply equal water reliability according to the Investigation's set of objectives?* Water Supply is considered a purpose of developing storage, according to the CALFED ROD, in that increased supply can contribute to achieving restoration, water quality, conjunctive use, and exchange objectives.
- *Is flood control a purpose or a secondary effect?* The investigation considers flood control to be a regional benefit that could result from the project, but is not a purpose for the project.

Alternatives Formulation and Feasibility Study Workplan

Bill Swanson noted that the alternative formulation approach first identifies storage option increments and then associated costs. The incremental analysis helps to identify potential economic breakpoints. Although it is reasonable to include conjunctive use projects, there are none that are described in sufficient detail presently. As described above, the team is developing details on specific, potential groundwater storage projects.

The participants commented on the amount of potential recharge relative to surface storage options, and requested future consideration of: 1) the cutoff for submission and consideration of conjunctive use projects and 2) an analysis of the potential for increased generation at existing powerhouses. The following are participants' general concerns and questions on alternative formulation and the Feasibility Study Workplan:

- *At Friant, why start at 125 thousand acre feet (TAF) as the lower limit?* 125 TAF roughly corresponds to a 20-ft raise of Friant Dam. The modeling team considered several sizes to provide information for a capacity vs. yield curve.
- *It looks like conjunctive use projects could be considered in combination with larger projects.* This is correct. Incremental analysis helps identify ultimate size for sustainable benefits with the least environmentally damaging effect.
- *Consider the potential benefits that would need to be associated with a conjunctive use project to gain local support.*

Next Steps

Jason Phillips asked the Committee to expect the following reports: 1) Phase 1 Report in late Summer and Feasibility Study Work Plan in October or November; 2) Temperance Flat options review; 3) hydropower evaluation, and 4) conjunctive use project identification.

Participant questions on the next steps included:

- *Will costs include power requirements for pumping at conjunctive use facilities?* Yes, those costs will be factored into the cost of the project.

Wrap Up

Charles Gardiner announced that the initial Phase 1 report will be made available 3 weeks before the next workshop, which will probably be in July or early August.

Workshop Participant	Organization
Jon Basila	SunMaid Raisin Growers of CA
Tom Boardman	San Luis and Delta Mendota Water Authority
John Brooks	U.S. Fish & Wildlife Service
Steve Burke	Protect Our Water
Julie Carpenter	Bureau of Reclamation
David Cehrs	
Marc Christopher	Friends of the River
Jim Cobb	Resource Management Coalition
Valerie Curley	Bureau of Reclamation
Phil Desatoff	Fresno County
Dennis Fox	
Lyn Garver	KRCD
Sean Geivet	Terra Bella Irrigation District
Bruce Haddix	CSU Fresno
Eric Hong	Department of Water Resources
David Hopelain	Eastern Madera Company
Randy Houk	Columbia Canal Company
Jared Huffman	NRDC
Ron Jacobsma	Friant Water User Association
Kimberly Knight	Cold Springs Rancheria
Steve Krueger	S.J. B.I.A., Resource Management Coalition
Paula Landis	Department of Water Resources
Bill Luce	Bureau of Reclamation
Orvil McKinnis	Westlands Water District
Steve Ottemoeller	Madera Irrigation District
Phil Pierre	Root Creek Water District
Lowell Ploss	San Joaquin River Group Authority
Denis Prosperi	
Kevin Richardson	Corps of Engineers
Mario Santoyo	Friant Water Users Authority
Kevin Shakespeare	Congressman Devin Nunes
Al Solis	Greenleaf Orchards
Jim Staker	San Luis Canal Company

Ernie Taylor	Department of Water Resources
Sharon Weaver	San Joaquin River Parkway and Conservation
Doug Welch	Greenleaf Orchards
Tina Williams	Cold Springs Rancheria

Study Team Members Present

Reclamation	Jason Phillips Claire Hsu
DWR	Richard Hayes Waiman Yip
PAM	Charles Gardiner
MWH	Anna Fock Stephen Osgood Yung-Hsin Sun Bill Swanson
CDM	Coral Cavanagh Sandra Lunceford Gina Veronese
MBK	Walt Bourez
SKS	Russ Grimes
Daniel B. Steiner, Consulting Engineer	Dan Steiner