Matilija Dam Ecosystem Restoration Project
Fine Sediment Management Study Group

Questionnaire for March 30 meeting
Please respond to the following questions, and circulate your responses to the Study Group members, and to Norma Camacho and Mary Selkirk, by COB, Friday, March 18, 2011.

Name & Affiliation: Bob Thiel, State Coastal Conservancy

Based on the consolidated flip-chart notes from the February 2 and 24 meetings:

1. Are there any other **major** constraints (or concerns by your organization) to the three major management options, *other than those listed on the notes?* No

2. Are there any other **major** data gaps or information needs, *other than those listed on the notes?*

   Do the assumptions made about the potential value of natural transport, based on experiences from dam removal projects in the Northwest, work in the Ventura River system, given the flashy, episodic, highly variable nature of its flow regime?

3. In your opinion, what are the **top three** data gaps or information needs that must be answered in order to develop a viable consensus solution to managing the fine sediments in Matilija Reservoir as part of the Matilija Dam removal project? *Please be as specific as possible and list them in descending order as you would prioritize them.* (1= first choice, 2=second, 3= third).

   1. How do we analyze and quantify the potential risks to the public water supply from the natural transport of fine sediments behind the dam, particularly from the nutrients and other contaminants embedded in the fines?

   2. Considering, cost, technical feasibility, and potential benefits, what would be the optimal combination of design components in a hybrid alternative to 4b?

   3. How do we analyze and quantify the impacts to steelhead, other aquatic organisms, and other beneficial uses from the phase natural transport of fine materials (versus from potential erosion from slurry disposal sites)?

4. In complete sentences---but in either bullet-item or paragraph format---please draft a **summary request for proposal/scope of work,** including expertise needed, to respond to the top data gaps or information needs that you have identified in Question 3 above.

(1) **Risks to water supply**: Conduct a probability analysis of the projected risks to the public water supply in the Ventura River watershed from the natural transport and mobilization of some or all of the nutrient-laden fine sediments in the Matilija basin. Those impacts would include the temporary degradation of downstream water quality, as well as increased nutrient loading into Lake Casitas.

The study would include (to the extent such work was not already completed in sufficient detail in earlier stages of the Matilija feasibility study and engineering work):

(a) Extensive sampling of reservoir sediments through a combination of borings and grab samples to determine volume, spatial distribution, particle size distribution, unit weight and chemical composition
(b) Laboratory analysis of the concentrations of N, P and other pollutants.
(c) Characterization of the chemistry of the fine sediments and level of pollutant concentrations
(d) Development of acceptable concentration levels
(e) Assumptions about (a) reservoir lowering, season and rate of drawdown and river flow as they affect TSS concentration levels and (b) environmental conditions (air and water temperatures, days of sunlight) that would promote algal blooms and other adverse impacts from nutrient transport.
(f) Use of appropriate sediment transport models to forecast downstream transport
(g) Quantify the risks under various project scenarios, discuss potential remediation efforts and their probable costs.

Compare the projected risks of the above water quality impacts to certain baseline conditions, such as:

- To what extent does Casitas currently manage turbid and nutrient-laden flows?
- What would be the costs to the water districts of a "no action" alternative that could eventually mobilize some of the nutrient-laden sediment in the reservoir?
- To what extent have the water purveyors benefited from the nutrient accumulation in the reservoir over the past 60 years and its function as an unintentional nutrient-sink?

Through the use of state-of-the art sediment transport models, as well as the results of pre- and post modeling of other large dam removal projects, analyze whether the resultant risks can be reduced by appropriate flow regime controls or additional design elements. For example:

- Can releases be timed during rising stages of flow to minimize impacts to the water districts?
- To what extent would optimal management of already proposed design components---the high flow sediment bypass and the desilting basin---manage the problem?
- In specific terms, how have other large dam removal projects---particularly those that potentially impacted a public water supply---managed large volumes of nutrient-laden sediments?

- Would the costs of water quality treatment over one or two seasons in Lake Casitas be significantly less than the various mechanisms needed to avoid any nutrient-laden sediment from entering Robles and the Lake (such as the 4b BRDA alternative)?

(2) **Optimal combination of components to hybrid solution:** Using a comparative cost/benefit analysis, examine the various proposals for modifying Alternative 4b that would add or substitue such features as upstream sediment management, permanent stabilization of some percentage within Matilija Canyon, natural transport (including interim and incremental notching of the dam) and downstream transport of water or sediment.

Measure all relevant costs, benefits, gains and losses of each design solution; account for all costs and benefits including subsidies and externalities. Conduct a cost/benefit analysis of various hybrid combinations.

Examine key questions associated with the major suggested components, such as

- How does a hybrid solution that includes both some slurrying as well as the "downstream option" significantly reduce the expense of managing the fine sediments, given the costs of infrastructure that would be needed for each of these design elements?

- Could design features such as an infiltration gallery or excavation of a backwater above the Robles intake structure, when used in conjunction with other design features (such as the high flow bypass and sediment basin) effectively manage the natural transport of sediment and avoid the high cost of slurrying or other complex solutions?

Identify potential means of avoiding or minimizing adverse effects associated with a suggested removal approach

Recommend a hybrid solution that is as cost-effective and environmentally sensitive as possible, while effectively managing the risk and uncertainty associated with sediment removal.

(3) **Impacts to steelhead:** Based on simulation studies and pre- and post-modeling results from other dam removal projects, analyze and identify the acceptable thresholds of high concentrations of suspended sediment for steelhead and other aquatic organisms in the Ventura River, including lethal levels to the species, impacts to habitat, reduced invertebrate production and other relevant considerations.

Can these thresholds be met by management of natural transport, including appropriate timing of releases?

Would these thresholds be acceptable to NMFS, DFG and the RWQCB?

Provide estimates of the recovery time from natural transport (i.e., the ability of the Ventura to flush out large amounts of sediment), based on such factors as sediment accumulation, the velocity of the river, the gradient of the riverbed, and the techniques for removal.

5. Looking forward, post Study Group: Do you have any other suggestions about *how* we should continue to develop solutions to the major data gaps on the fine sediments?

Appoint a technical advisory team of academic experts, agency staff and consultants in such areas as fluvial geomorphology, sediment and nutrient management, river restoration, aquatic biology and other appropriate disciplines to advise the Corps, District, the Bureau, the Design Oversight Group and the sediment management study group on resolution of the major issues regarding management of the fine sediments.

Retain outside consultants, as may be appropriate, to undertake the key studies identified by the study group or to assist the Corps, the Bureau (and perhaps USGS) in conducting those studies.