Sediment Management and Restoration Opportunities

for the

Matilija Dam Ecosystem Restoration Project

- Matilija Coalition -

The Matilija Dam Ecosystem Restoration Project has been delayed by lack of funding and difficulties associated with the management of approximately two million cubic yards of fine sediment (approximately one third of the total sediment) that has accumulated behind the dam. Despite the current uncertainty regarding sediment management, there remains an opportunity to design and implement a project that could serve as an international showcase of ecosystem restoration. The key is to maintain the approach and intent of the consensus plan already approved through the Feasibility process, and to retain the support of all stakeholders. It is important to recognize that achieving this goal will require a collaborative effort with a multi-disciplinary team of experts in the fields of river and habitat restoration, fluvial processes, and fisheries and wildlife restoration, as well as the engineers and resource agencies responsible for the outcome of this project.

ECOSYSTEM RESTORATION PROJECT OBJECTIVES:

- Improve Aquatic And Terrestrial Habitat Along Matilija Creek And Ventura River
- Restore Fish Passage to Benefit the Endangered Southern Steelhead
- Restore Natural Processes To Support Beach Sand Replenishment
- Enhance Public Outdoor Recreational Opportunities

The area upstream of Matilija Dam is one of the primary restoration sites within the Ecosystem Restoration Project, and the ultimate success of the project hinges on how this reach of the river is managed. The conceptual design for upstream sediment management described in the 2004 Feasibility Report specifies ***temporary*** sediment disposal areas, which were carefully selected to minimize impacts to the existing habitat and provide for the restoration of a naturally meandering and shifting stream channel upstream of the current dam site. This restored temporary 'pilot' channel is intended to provide a quasi-equilibrium starting point to provide for the natural evolution of the canyon following dam removal.

In response to the recent proposal to attempt to *permanently* sequester the fine sediments in Matilija Canyon, it is useful to re-frame the question as follows:

> ***Can the RESTORATION of Matilija Canyon be designed in a manner consistent with the Feasibility Study plan so that (a) a meandering stream channel is constructed of natural material upstream of the current dam site, and (b) sediments are managed so that downstream interests are not unduly impacted and project objectives are optimized?***

The following outline includes potential solutions to the sediment management issues and brainstorming ideas intended to optimize the Ecosystem Restoration objectives for the removal of Matilija Dam. We look forward to the opportunity to discuss these concepts and move forward with the Matilija Dam Ecosystem Restoration Project.

1) Sediment Management:

The full suite of sediment management alternatives should be reconsidered within the framework of the approved consensus plan. There may be potential for a combination of strategies to optimize restoration opportunities and minimize overall project impacts and cost.

a. **Slurry of Fine Sediment:** This is the approved plan, and serious consideration of the design, management, feasibility, and optimization of the temporary sediment storage sites in the vicinity of Baldwin Road should be a priority. (One option may be phased slurry to allow opportunity for natural flushing and reuse of these areas following a storm event.) Any significant deviation from this plan may result in further significant delays and potential cost increases.

b. **Upstream Sediment Management:** Fine sediment may be dewatered and mixed with coarse sediment for deposition within previously designated upstream temporary storage areas.

   i. Dewatering will facilitate aerobic processes and reduce real or perceived risk of downstream transport of organic components.

   ii. This material will provide rich topsoil, which is essential for revegetation of the disposal areas.

   iii. Revegetation will be necessary to control surface erosion and stabilize slopes, as well as reduce invasive non-native plants.

c. **Permanent Stabilization:** Any attempt to construct permanent structures in the floodplain will have far-reaching negative consequences. However, there may be an opportunity to sequester a portion of the fine sediments beneath Matilija Road on the left bank of the creek. This would provide the benefit of raising the road out of the floodplain and may provide an opportunity for permanent stabilization of some material outside of the active channel, while making use of an already impacted site.

d. Other Mechanical Transport Options: Some fine sediment may be trucked or slurried to off site locations for temporary storage, resale, agricultural, or other use. For example, gravel trucks that currently return empty to Cuyama Valley may be available to transport some sediment over Hwy 33.

e. Other Sediment Management Options - Natural Transport: This is the most cost-effective approach for managing sediments accumulated behind the dam, and it is important to recognize that the river's large capacity to transport sediment during major (though irregular) flood events. The Hydraulics and Hydrology reports indicate that high flows are capable of transporting virtually all of the fine sediments to the ocean in a single event. The potential for incremental removal of the dam combined with upstream sediment management should be seriously reconsidered within the context of Water Supply Considerations (see section 2 below) to prevent future build up of sediments and to remove accumulated sediments in the Matilija Reservoir.

   i. Interim Notching: Removing the upper portion of the dam down to the current reservoir sediment level would prevent the further accumulation of sediment (potentially up to an additional 3 million cubic yards). This would reduce the potential increase of costs associated with any of the potential sediment management options, provide valuable experience in removing and re-cycling large amounts of concrete, and help build momentum for the project.

   ii. Incremental Notching: Incremental removal of a small portion of the dam below the silt-line would allow the natural transport of currently stored sediments

during high flow events. A vertical 'slot' could be constructed in the dam to a level below the silt line with a gate to provide timed controlled release of sediments. This would increase the sluicing efficiency of flows, both through the slot, and in the channel that would be cut upstream through the reservoir sediments. Sluicing through this slot could be coordinated with the operation of the high-flow sediment bypass to ensure fine sediments would be transported downstream of the Robles Diversion. Incremental notching could be a supplement to Alternative 4b, and not necessarily a substitute.

2) Water Supply Considerations:

The Feasibility Plan was designed around concerns related to the Robles Diversion Dam downstream of Matilija Dam. The discussion has become unnecessarily constrained due to concerns of releasing fine sediments, despite the fact that the district currently diverts turbid water from both the North Fork Matilija Creek and flows overtopping Matilija Dam. Natural upland erosion (particularly during major flows following wildfires) and chronic artificial sources such as the Ojai Rock Quarry contribute to existing high turbidity during storm events, and Matilija Reservoir often impacts water quality for weeks after such storms. Temporary incremental increases in turbidity may be tolerated if technical analysis can quantify the impact and mitigation.

a. Bypassing of flow at Robles diversion during planned high turbidity events
    i. Mitigation for CMWD operations within the Feasibility Plan includes the High Flow Sediment Bypass and fine sediment 'Desilting Basin.'
    ii. Casitas Water District has already committed to the use of 4,500 AF of water for slurry in the Feasibility Plan. If slurry is not used, this water could be available for mitigation.
    iii. Analysis should be conducted to consider optimizing operations of the CMWD diversion with the new Desilting Basin and High Flow Bypass to minimize the net loss of diversion opportunity.

b. Other Mitigation
    i. Increased treatment of water taken from Lake Casitas
    ii. Future dredging potential at Casitas Reservoir to maintain capacity.

3) Restoration Design for Reservoir Area within Matilija Canyon:

a. Channel alignment should be sensitive to existing habitat as described in the Feasibility Plan. The objectives are to provide:
    i. A functional riparian and floodplain corridor.
    ii. A quasi-equilibrium 'starting point' for future geomorphology and hydraulics/hydrology

b. Upstream ***temporary*** sediment 'storage sites' should be designed to provide:
    i. Stable slopes
    ii. Natural erosion patterns
    iii. Limit mass wasting to extreme (>10yr) events as agreed to in the Feasibility Plan

c. Minimize the use of permanent or semi-permanent 'soil cement' or other hard streambank stabilization

   i. Hard structures preclude re-established riparian vegetation and habitat restoration, and reduce beach nourishment benefits.

   ii. Hard structures cause scour and increase the potential for failure.

   iii. Future maintenance and management within the floodplain will disrupt ecosystem restoration.

d. Existing resources in the project area should be protected and/or re-used based on a cost-effective bio-engineering design approach. Such methods are being used throughout the State of California and elsewhere. The intent would be to implement a project that would require minimal future 'adaptive management' and large-scale maintenance, hence also reducing overall costs of the project.

   i. Large boulders and trees that need to be removed should be re-used for streambank and hillside stabilization or reused for restoration in the downstream river channel.

   ii. Woody debris should be mulched and reused to minimize surface erosion and facilitate revegetation.

   iii. Fine sediments should be combined with other sand/gravel and organic material to facilitate revegetation and minimize surface erosion.

4) Procedural Considerations:

a. Technical Steering Committee:

   i. Technical and environmental working groups should be re-convened in a multi-agency stakeholder process separately from the political forum of the 'Design Oversight Group.'

   ii. Technical team should include river and habitat restoration experts, fluvial geomorpologists, fish and wildlife scientists, dredge and mining experts, and others, as well as the responsible resource agencies.

b. Independent Review

   i. Technical and economic analysis should be conducted by a qualified independent consultant team.

   ii. Project objectives should be optimized through an ecosystem-based restoration design approach.

5) Funding

a. The following are central to securing funding:

   i. Restoring stakeholder engagement and support.

   ii. Developing a showcase Ecosystem Restoration project.

   iii. Increasing cost effectiveness.

b. Consider creative funding opportunities, such as private monies, resale of aggregate or other materials, demo-demonstration, military training, etc.